

Assessment and Instruction of Self-Recognition

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About 2 years ago an experienced preschool special education teacher approached the author to discuss a concern she had about a segment of her morning circle routine. During that segment, the teacher presented each child with two enlarged photographs; one was a self-photograph (of the child) and the other was a photograph of a peer. The teacher expected that each child would select the self-photograph when requested. An individualized greeting song that was highly reinforcing followed selection of the self-photograph. Some of the children were just as likely to select the peer's photograph as their own. The teacher was concerned that her students were not making progress in learning to recognize their own images even though the lesson was provided daily. This conversation sparked the author's interest in the topic of self-recognition.

Many teachers of children with disabilities incorporate photographs of people during the school day as part of daily schedules, choice-making, attendance, and turn-taking opportunities. They often hold the expectation that the child with disabilities will be able to discriminate the photographs of others from a self-photograph. It is important to understand the developmental sequence of self-recognition so that

instruction is provided at an individually appropriate level. This article explains the development of self-recognition and provides both assessment and instructional suggestions for teachers working with students with disabilities of all ages.

Importance of Self-Recognition

Self-recognition is the recognition of one's own image as representing oneself. Self-recognition is an early form of social cognition (Kelly, Sexton, Burdick, & Haynes, 1988) and is essential to learning to think about oneself and one's actions (Gallup, 1979) and to expressing empathy (Lewis & Ramsay, 1997). Self-recognition is a measure of self-awareness (Lewis & Ramsay) and its achievement influences other areas of development (Berk, 2002). Children who have achieved self-recognition are able to engage in synchronous imitation of another's behavior while that behavior is occurring (Nielssen, Suddendorf, & Dissanayake, 2006). Children who have achieved self-recognition engage in longer periods of shared attention while imitating adults (Asendorpf & Baudonniere, 1993; Asendorpf, Warkentin, & Baudonniere, 1996). The achievement of imitation, a critical and efficient means for learning new cognitive and communication



skills (Nadel, 2006), is founded on the child's ability to recognize him- or herself as separate from another.

Measuring the Performance of Self-Recognition

Research studies on self-recognition performed in the 1970s and 1980s concentrated on the child's response to mirrored images and used either the



mark test or the object test to measure self-recognition. In the *mark test* (the most frequently used measure) the examiner would pretend to wipe the child's nose but instead would put a nonscented rouge mark on the child's nose or face. If the child looked in the mirror and then touched the rouge mark, the child was said to have

achieved self-recognition. The *object test* involved placing an object so that the child could view both self and the object in the mirror. For example, a toy might be suspended from above and behind the child and then moved into the visual space covered by the mirror. If the child noticed the object in the mirror and then gestured toward the object, it was believed that the child recognized himself because he recognized the relationship of the object to himself based on the mirrored images. The mark test is still regarded as the most valid measure of self-recognition (Vyt, 2001). Research in the 1990s and 2000s addressed the development of time-delayed self-recognition and labeling of self-image in photos and video.

Achievement of Self-Recognition in Children Without Disabilities

Although there have been challenges to Piaget's developmental stages, the Piagetian framework is useful to understanding how children grow toward increasingly complex thought including the development of self-recognition. No self-recognition occurs in *Sensorimotor Substage 1: Reflexive Schemes* (0–1 month) or *Substage 2: Primary Circular Reactions* (1–4 months). In *Substage 3: Secondary Circular Reactions* (4–8 months), children reach toward a mirrored image. Children at *Substage 4: Coordination of Circular Reactions* (8–12 months) look at the mirror and then reach to touch something attached to their bodies (associated with the goal-directed behavior achieved in this substage). Children at *Substage 5: Tertiary Circular Reactions* (12–18 months) reach toward something that is not attached to their bodies (this is as a result of their increas-

ing problem-solving abilities). Children at *Substage 6: Mental Representations* (18–24 months) achieve the mark test (Berk, 2002; Isaacs, 1972). This is the stage at which the child is now able to internally represent his own image, which is necessary to recognizing a change in self-image.

The development of self-recognition does not end with the achievement of the mark and object tests. Time-delayed self-recognition in photographs and video images occurs between the ages of 3 and 4 years (Zelazo, Sommerville, & Nichols, 1999). Povinelli, Landau, and Perilloux (1996) found that 35- to 40-month-old children labeled their image with their proper name and that 53- to 58-month-old children labeled the image as "me" (which the researchers perceived to be a higher level of self-recognition). So, although real time self-recognition is achieved at about 18 months in children without disabilities, time-delayed self-recognition is achieved much later.

Achievement of Self-Recognition by Children With Disabilities

Research on the development of self-recognition in children with disabilities has focused on children with intellectual disabilities (especially children with Down syndrome) and children with autism using the same mark and object tests discussed earlier. Studies on children with intellectual disability have found that they develop self-recognition in the same sequence as children without disabilities and in a similar timeframe when mental age is considered instead of chronological age (Hill & Tomlin, 1981; Kelly et al., 1988; Mans, Cicchetti, & Sroufe, 1978). Hill and Tomlin noted improved self-recog-

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nition performance as early as in the second study session of four, suggesting the importance of experience with images to the development of self-recognition in children with intellectual disabilities. They also found that the children with intellectual disabilities first responded to images of objects before images of self in the mirror and that they demonstrated fewer emotional reactions to their own images than what had been demonstrated by children without disabilities in previous studies.

Fryrear, Kodera, and Kennedy (1981) studied 30 adolescents with Down syndrome and found that they had difficulty recognizing images of their facial profile and partial frontal facial images. These researchers suggested that individuals with intellectual disability may use fewer facial components to support self-recognition and that the lack of a well-integrated and flexible body image might account for difficulty in recognizing nonfrontal views of themselves.

Research in autism has found no autistic effect on the achievement of self-recognition (Dawson & McKissick, 1984; Ferrari & Matthews, 1983), but there may be differences in how best to measure self-recognition in children with autism. Dawson and McKissick noted that participants with autism vocalized less often and touched their bodies more often (than did children without autism) when viewing their images in the mirror. Spiker and Ricks (1984) chose the location of the mark (for the mark test) based on knowledge of each child's self-stimulatory behavior (e.g., the mark was placed where the child did not engage in perseverative touching so that touching the mark was not confused with self-stimulation). They also asserted that change in affect was not a good way to measure early self-recognition in children with autism. Spiker and Ricks

concluded that cognitive level (but not lack of speech) was related to the achievement of self-recognition in children with autism. They suggested the need to examine how communication interventions (especially the use of gestures) could accelerate mastery of self-recognition to children with autism.

Teacher Assessment of Self-Recognition

Teachers can assess the achievement of self-recognition by identifying the relevant items in commercial tools or by using informal structured assessments that are based on research evidence. See box, "Assessment Tools," which displays items from several assessment tools that are appropriate for use with children who have disabilities. These tools were selected for their breadth of coverage of self-recognition (following a review of six commercial tools). This information is provided to support the

Assessment Tools

The *HELP Strands: Curriculum-Based Developmental Assessment*, adapted from the *Hawaii Early Learning Profile* (HELP; Parks, 1996, pp. 20–21) addresses the achievement of self-recognition in Section 5-2 *Development of Self* within the Social-Emotional strand. The self-recognition items follow:

- Smiles at mirror image (or brightens in recognition).
- Responds playfully to mirror (laughs, pats, or reaches toward mirror; makes faces; mouths; or vocalizes).
- Identifies self in mirror (points to image when asked, removes sticker or wipes from face when seen in mirror).
- Recognizes self in photograph.

The *Carolina Curriculum for Infants & Toddlers With Special Needs* (Johnson-Martin, Attermeir, & Hacker (2004, pp. 117–119, 125) addresses self-recognition in the *Sequence 3: Self-Concept* under Personal-Social). The items follow:

- Plays with mirror image (precedes self-recognition, but is related).
- Recognizes self and others in mirror.
- Distinguishes and names self in photographs.

The *Developmental Assessment for Individuals With Severe Disabilities* (DASH 2; Dykes & Erin, 1999, pp. 3, 5, 6, 8, 10) is an appropriate assessment tool to use with all students with severe disabilities including older students who can still benefit from learning self-recognition. The following items related to self-recognition are found in the *Social-Emotional Pinpoint Scale*:

- Looks, smiles, and vocalizes when sees reflection in mirror (precedes self-recognition).
- Reaches for and pats at own image in mirror or at another person close by (precedes self-recognition).
- Reaches for image of toy or object when seen in a mirror (precedes self-recognition).
- Looks at, points to, says name, or otherwise indicates recognition of self in mirror.
- Identifies mirror image of self by first name, on request.
- Identifies self in group photo on request ("Who's that?").

teacher who may want to cite specific assessment tools on the child's individualized education plan.

Figure 1 depicts a structured informal assessment of self-recognition. This original assessment was based on a review of the literature with items sequenced according to research findings. While the items are sequenced developmentally, the reader is cautioned that the sequence may be impacted by disability and may vary by individual.

Teaching Self-Recognition

There is evidence that experience with images supports the recognition of images (Hill & Tomlin, 1981; Sangrigoli & deSchonen, 2004). Therefore, the provision of specific experiences at the appropriate level of development may facilitate the mastery of self-recognition in children with disabilities. Items from commercial assessment tools and an informal structured assessment such as in Figure 1 can provide guidance about where instruction should begin for an individual child. Although the approach to assessment is developmental, lessons should occur within functional activities and age appropriate materials should be used.

Children with disabilities, especially those who are nonambulatory, may have fewer experiences with mirrors; it is important, therefore, that family members and teachers provide greater access to mirrors. Nonbreakable mirrors come in various sizes to be held or attached to a wall. Some small unbreakable mirrors are called *speech mirrors*, because they are used for articulation exercises. They may include a base that facilitates placement on the tabletop or wheelchair tray. When the child responds to the mirrored image with a change in affect or by increased movement (possibly very early self-recognition behaviors), adults can respond by gesturing to the mirrored image and saying the child's name.

Mirror play can also incorporate the use of objects and other people. Large mirrors can be placed horizontally on the lower part of the wall so children can view themselves while at play.

Figure 1. Structured Informal Assessment of Self-Recognition

1. Does the child react to seeing his- or herself in the mirror? How?
2. Do you see a change in affect when the child sees his or her image in the mirror?
3. Does the child touch his or her image in the mirror?
4. Does the child touch the mirror image and then touch him- or herself?
5. If you change the child's image (mark test) while the child is looking in the mirror, does the child react (laugh or touch what you changed)? (You might put rouge on the child's nose or a hat on the child's head.)
6. If the child is seated in front of a large mirror and a preferred person then also appears in the mirror, will the child touch the image?
7. If the child is seated in front of a large mirror and a preferred person then also appears in the mirror, will the child look at the image and then touch the real person?
8. If you place an object next to the child while the child is looking into a large mirror, does the child look at or touch the image of the object?
9. If you place an object next to the child while the child is looking into a large mirror, does the child look at or touch the real object (e.g., not just the mirrored image)?
10. Does the child become excited when seeing his or her own image in photos or videos?
11. Does the child touch self or self-gesture when seeing his or her own image in photos or videos?
12. When looking in the mirror and being asked, "Who's that?" does the child self-gesture?
13. Does the child say his or her name when looking at his or her own image in photos or videos?
14. Does the child say "me" when looking in the mirror or when asked, "Who's that?" while looking in the mirror.
15. Can the child select his or her own image from a field of two with accuracy of 75% or more?
16. Can the child select his or her own image from a field of three with accuracy of 75% or more?
17. Can the child gesture to his or her own image from a group photo?
18. Can the child name his or her own picture when the image appears in a group photo?

Note. From *Structured informal assessment of self-recognition* by S. Bruce, 2006 Copyright 2006, Boston College, Chestnut Hill, MA. Reprinted with permission.

Large mirrors placed vertically will allow the child to view him- or herself with adults while gaining exposure to more than facial features. Adults can facilitate understanding of the relationship between a real object and the mir-

rored image by pointing to the object's image in the mirror, naming it, and then touching the real object and naming it again. The same procedure can be followed when supporting the child to make connections between mirrored



images of adults and peers and the actual people. Moving with the child while looking in the mirror may support the child to connect the movement he or she is experiencing to the image in the mirror, thus supporting understanding of simultaneous agent and recipient roles.

Experiences with mirrors can be incorporated into greeting routines at school. For example, the teacher may point to the child's image and say the child's name. The mirror can be removed and the teacher can pair self-gesture on the child's body and the child's name. A similar procedure with mirrors could be followed during grooming activities. After early signs of self-recognition are established, the teacher might pose the question, "Who's that?" when viewing the mirrored image. Children who are using voice output devices could have an icon with their picture. The message could be the child's name and or the statement, "It's me."

When asking a child to select his own photograph within school activi-

ties, it may be best to avoid presenting more than one photograph until the child shows some sign of self-recognition. The teacher might first present a photograph of the child only (for errorless learning). This could be followed by a choice between the self-photograph and a blank sheet of paper (as seen in the accompanying photo-

own photograph within a routine context (such as morning circle), it may be best to avoid having the child handle the photographs of others or to place the photographs of others on an attendance board. A mixture of activities involving photographs within the same context may confuse the child about what behavior is expected.

The provision of specific experiences at the appropriate level of development may facilitate the mastery of self-recognition in children with disabilities.

graph). The next step could be a choice between a self-photograph and a partial drawing of a face. Finally, after success at these earlier stages of recognition, the child may be ready for identifying his own photograph. Through this systematic approach to instruction, the teacher is simply teaching the knowledge before testing the knowledge.

When expecting the child with severe intellectual delays to select his

There are many ways to incorporate the child's photograph within the family home. The child's photograph can be placed on the refrigerator and named whenever the child is in the kitchen. Photographs of other family members can then be added, and the child can be asked to locate the self-photograph. The child's photograph can be displayed on his or her bedroom door, closet door, or toy box to signify his or her room and belongings.

Later, the child's photograph can be embedded into a placemat, and the child can be asked to locate his seat at the dinner table. Photographs of family members can also be matched with tasks on the family chore list.

As the child shows recognition of his own image, adults can increase opportunities to view his- or herself in both group photographs and videos with an increase in time delay (between when the image was captured and when it was shared with the child). The family or school staff might make a video of the child wearing a particular shirt and then have the child view the video while wearing that same shirt (first with little time delay and then gradually increasing the time delay). The shirt provides an additional perceptual feature to support self-recognition. Families can support the development of self-recognition at a higher level by increasing the opportunities to look at family photographs. Parents or older siblings can point to the child and say the child's name. They can also model pointing to their images paired with self-gesturing or saying, "That's me."

Conclusion

Self-recognition is a component of self-awareness. It is founded on the development of early mental representations, and it influences the achievement of other milestones including imitation. Self-recognition is achieved gradually. Mirror-directed behaviors such as changes in affect or movement in response to the mirrored image are among the earliest developmental markers of self-recognition. More advanced self-recognition behaviors, such as locating one's self in a video or family photograph are achieved later. Instruction of self-recognition to the child with a disability should be founded on careful assessment with the understanding that real time self-recognition (as evoked in activities using mirrors) is achieved long before recognition of self in photos and video. Children with disabilities can be supported to develop self-recognition by teaching the appropriate level of self-

awareness within the context of functional and age appropriate activities.

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